

Claims

- [c1] 1.A diesel exhaust gas treatment system comprising:
an oxidation catalyst positioned in an exhaust gas passage of a diesel engine
for converting at least a portion of NO contained in said exhaust gas to NO_2 ,
said oxidation catalyst comprising platinum and a support material comprising
zirconia-silica; and
a particulate filter for receiving said exhaust gas.
- [c2] 2.The system of claim 1 wherein said oxidation catalyst is positioned between
said exhaust passage and said particulate filter.
- [c3] 3.The system of claim 1 wherein said oxidation catalyst is combined with said
particulate filter.
- [c4] 4.The system according to claim 1 further including a second catalyst
positioned downstream from said particulate filter.
- [c5] 5.The system according to claim 4 wherein said second catalyst comprises a
selective reduction catalyst.
- [c6] 6.The system according to claim 1 further including a NOx trap positioned
downstream from said oxidation catalyst.
- [c7] 7.The system of claim 1 wherein said oxidation catalyst comprises from about 1
to 5 wt.% platinum on a support containing from about 3 to 20 wt.% zirconia,
and the balance silica.
- [c8] 8.The system of claim 1 wherein said oxidation catalyst includes one or more
oxides selected from the group consisting of TiO_2 , P_2O_5 , WO_3 , B_2O_3 ,
and Al_2O_3 .
- [c9] 9.The system of claim 1 wherein said oxidation catalyst has been prepared with
the addition of a heteropolyacid selected from $\text{H}_3\text{PW}_{12}\text{O}_{40}$ and $\text{H}_4\text{SiW}_{12}\text{O}_{40}$.
- [c10] 10.A method for treating diesel exhaust gases comprising:
positioning an oxidation catalyst in an exhaust gas passage of a diesel engine ,

said oxidation catalyst comprising platinum and a support material comprising zirconia-stabilized silica;
 providing a particulate filter downstream of said oxidation catalyst;
 exposing said oxidation catalyst to diesel exhaust gas containing NO such that at least a portion of said NO contained in said exhaust gas is converted to NO₂; and
 passing said NO₂ through said particulate filter in an amount sufficient to oxidize particulate matter trapped on said filter.

- [c11] 11.The method of claim 10 wherein said oxidation catalyst comprises from about 1 to 5 wt.% platinum on a support containing from about 3 to 20 wt.% zirconia and the balance silica.
- [c12] 12.The method of claim 10 including pretreating said oxidation catalyst in a gas mixture containing NO, O₂ and N₂ prior to positioning said catalyst in said exhaust stream.
- [c13] 13.The method of claim 12 wherein said gas mixture comprises about 500 ppm of NO, about 3% by volume O₂, and the balance N₂.
- [c14] 14.The method of claim 12 wherein said pretreatment is carried out a temperature of between about 500 to 650 ° C.
- [c15] 15.The method of claim 10 including adding one or more oxides to said oxidation catalyst prior to positioning said oxidation catalyst in said exhaust stream, said one or more oxides being selected from the group consisting of TiO₂, P₂O₅, WO₃, B₂O₃, and Al₂O₃.
- [c16] 16.The method of claim 10 including adding a heteropolyacid selected from H₃PW₁₂O₄₀ and H₄SiW₁₂O₄₀ to said oxidation catalyst prior to positioning said oxidation catalyst in said exhaust stream.
- [c17] 17.The method of claim 10 wherein about 60% to about 96% of NO contained in said exhaust gas is converted to NO₂.
- [c18] 18.The method of claim 10 further including providing a second catalyst downstream of said particulate filter and passing said exhaust gas over said

second catalyst.

[c19] 19.The method of claim 18 wherein said second catalyst is a selective reduction catalyst.

[c20] 20. The method of claim 10 further including a NOx trap positioned downstream of said oxidation catalyst.

[c21] 21.The method of claim 10 wherein said conversion of NO to NO₂ occurs at a temperature of between about 175 to 350 ° C.

[c22] 22.The method of claim 10 wherein said conversion of NO to NO₂ occurs at a temperature of between about 200 to 250 ° C.

[c23] 23.The method of claim 10 wherein said oxidation of particulate occurs at a temperature less than about 250 ° C.

[c24] 24.A method for treating diesel exhaust gases comprising:
positioning an oxidation catalyst in an exhaust gas passage of a diesel engine ,
said oxidation catalyst comprising platinum and a support material comprising zirconia-stabilized silica;
providing a particulate filter in combination with said oxidation catalyst;
exposing said oxidation catalyst to diesel exhaust gas containing NO such that at least a portion of said NO contained in said exhaust gas is converted to NO₂ ; and
passing said NO₂ through said particulate filter in an amount sufficient to oxidize particulate matter trapped on said filter.

[c25] 25.A diesel exhaust gas treatment system comprising:
a particulate filter for receiving diesel exhaust gas from a diesel engine;
an oxidation catalyst for converting at least a portion of NO contained in said diesel exhaust gas to NO₂ , said oxidation catalyst comprising platinum and a support material comprising zirconia-silica; wherein said oxidation catalyst is impregnated in said particulate filter.

[c26] 26. A diesel exhaust gas treatment system comprising:
a first oxidation catalyst for converting at least a portion of NO contained in

said diesel exhaust gas to NO_2 , said oxidation catalyst comprising platinum and a support material comprising zirconia-silica; and
a second oxidation catalyst different from said first oxidation catalyst; wherein said first and second oxidation catalyst are positioned in combination in the exhaust gas passage of a diesel engine.

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